

NCR-19-7519



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200
Fax 613 632-5246

PRELIMINARY ISSUE D5549-5
Job Sheet 200566



Part No: D5549-5

Job Qty: 1 pcs

Part Name: Fwd Beam



Part Weight: 0 lbs

Job Created: 9/12/19

Due Date: 9/25/19

Type: Stock

Note: URF 19-880 DWG D5549 REV.C IPP REV:A 19.09.03 NEW ISSUE DD VERF:JFS

Ship Via:

UNDER REVIEW

URF19-880

Status: New

Job Tracking No:

Created By: Marie Lajeunesse

Description:

Priority: Medium

*this is for test fit with
Pacific Helicopters

SAD
19/09/19

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard Setup Run Hrs Hrs	Workcenter/Supplier	Lead Time	Sign-off
100	Waterjet - Flow - 1	1 pcs		9/25/19	0.17 2.18	Waterjet - Flow	9/24/19	JRB
110	QC 2	1 pcs		9/25/19	0.00 0.00	QC 2 - 1		
						QC 2 - 12		
						QC 2 - 14		
						QC 2 - 17		
						QC 2 - 19		
						QC 2 - 2		
						QC 2 - 20		
						QC 2 - 22		
						QC 2 - 23		
						QC 2 - 25		
						QC 2 - 32		
						QC 2 - 33		
						QC 2 - 35		
						QC 2 - 39		
						QC 2 - 4		
						QC 2 - 40		
						QC 2 - 44		
						QC 2 - 45		
						QC 2 - 48		
						QC 2 - 49		
						QC 2 - 50		
						QC 2 - 51		
						QC 2 - 52		
						QC 2 - 57		
						QC 2 - 62		
						QC 2 - 63		
						QC 2 - 8		
						QC 2 - 66		
						QC 2 - 64		

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POSITIVE RECALL

EFFECTIVE 9/09/24 AUTH SAR

RELEASED DATE SEP-30 2019

55 9-89

Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
CANADA
TEL: 1 613 832-5200
Email: sales@dartaero.com
www.dartaero.com



Container No: S216484

Part: D5549-5

Job No: 200566

Serial No/Batch: S216484

Revision: C

Inspector:

Exp Date:

Instructions: Various STC's

Date: 09/24/19

PRIORITY

					QC 2 - 65	
					QC 2 - 5	
					QC 2 - 71	
					QC 2 - 73	
					QC 2 - 69	9/24/19 80
120 HAAS 4 Axis - B4B	1 pcs	9/25/19	1.00	1.00	HAAS - 1 - B4B	
					HAAS - 2 - B4B	DAS
					HAAS - 3 - B4B	64
					HAAS - 4 - B4B	9-89 11/11/2019/09/25
130 QC 2	1 pcs	9/25/19	0.00	0.00	QC 2 - 1	
					QC 2 - 12	
					QC 2 - 14	
					QC 2 - 17	
					QC 2 - 19	
					QC 2 - 2	
					QC 2 - 20	
					QC 2 - 22	
					QC 2 - 23	
					QC 2 - 25	
					QC 2 - 32	
					QC 2 - 33	
					QC 2 - 35	
					QC 2 - 39	
					QC 2 - 4	
					QC 2 - 40	
					QC 2 - 44	
					QC 2 - 45	
					QC 2 - 48	
					QC 2 - 49	
					QC 2 - 50	
					QC 2 - 51	
					QC 2 - 52	
					QC 2 - 57	
					QC 2 - 62	
					QC 2 - 63	
					QC 2 - 8	
					QC 2 - 66	
					QC 2 - 64	11/11/2019/09/25
					QC 2 - 65	
					QC 2 - 5	
					QC 2 - 71	
					QC 2 - 73	
					QC 2 - 69	
140 QC 8	1 pcs	9/25/19	0.00	0.00	QC 8 - 12	
					QC 8 - 14	
					QC 8 - 17	
					QC 8 - 20	
					QC 8 - 25	
					QC 8 - 3	
					QC 8 - 32	
					QC 8 - 33	
					QC 8 - 35	
					QC 8 - 39	
					QC 8 - 4	
					QC 8 - 44	
					QC 8 - 45	
					QC 8 - 49	
					QC 8 - 58	
					QC 8 - 8	8.0 19-09-27

					QC 7 - 48	
					QC 7 - 51	
					QC 7 - 58	
					QC 7 - 59	
					QC 7 - 60	
					QC 7 - 9	
					QC 7 - 68	
					QC 7 - 50	
					QC 7 - 67	
					QC 7 - 40	
					QC 7 - 24	
					QC 7 - 43	
					QC 7 - 61	
					QC 7 - 81	
					QC 7 - 76	
170 Powdercoat - 1 White GI(A)-B4B	1 pcs	9/25/19	0.00 0.11	Powdercoat - 1 - B4B		
				Powdercoat - 2 - B4B		
				Powdercoat - 3 - B4B		
				Powdercoat - 4 - B4B		
180 QC 3	1 pcs	9/25/19	0.00 0.00	QC 3 - 10		
				QC 3 - 13		
				QC 3 - 15		
				QC 3 - 17		
				QC 3 - 18		
				QC 3 - 2		
				QC 3 - 28		
				QC 3 - 3		
				QC 3 - 30		
				QC 3 - 34		
				QC 3 - 36		
				QC 3 - 41		
				QC 3 - 51		
				QC 3 - 58		
				QC 3 - 59		
				QC 3 - 68		
				QC 3 - 9		
				QC 3 - 40		
				QC 3 - 19		
				QC 3 - 43		
				QC 3 - 24		
				QC 3 - 61		
				QC 3 - 81		
190 Packaging 3-1 - Stock - B4B	1 pcs	9/25/19	0.00 0.00	Packaging 3 - 1 - B4B		
				Packaging 3 - 2 - B4B		
				Packaging 3 - 3 - B4B		
				Packaging 3 - 4 - B4B		
				Packaging 3 - 5 - B4B		
				Packaging 3 - 6 - B4B		
				Packaging 3 - 7 - B4B		
				Packaging 3 - 8 - B4B		
				Packaging 3 - 9 - B4B		
				Packaging 3 - 10 - B4B		
				Packaging 3 - 11 - B4B		
				Packaging 3 - 12 - B4B		
				Packaging 3 - 13 - B4B		
				Packaging 3 - 14 - B4B		
				Packaging 3 - 15 - B4B		
				Packaging 3 - 16 - B4B		
				Packaging 3 - 17 - B4B		

DAS
55
9-89

SEP 30 2019

DAS
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9-89

SEP 30 2019

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SEP 30 2019

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BK 19 9-27

POSITIVE
RECALLSee
Eng
David O
OR
Steven PDAS
55
9-89

SEP 30 2019

SEP 30 2019

DAS
40
9-89DAS
28
9-89

				QC 8 - 9	
				QC 8 - 68	
				QC 8 - 67	
				QC 8 - 1 (A)	
				QC 8 - 47	
				QC 8 - 40	
				QC 8 - 52	
				QC 8 - 23	
				QC 8 - 57	
				QC 8 - 76	
150 Handfinish - 1-1 Chemical-B4B	1 pcs	9/25/19	0.00 0.49	Handfinish - 1 - 1 - B4B	SEP 27 2019
				Handfinish - 1 - 2 - B4B	
				Handfinish - 1 - 3 - B4B	
				Handfinish - 1 - 4 - B4B	
				Handfinish - 1 - 5 - B4B	
				Handfinish - 1 - 6 - B4B	
				Handfinish - 1 - 7 - B4B	
				Handfinish - 1 - 8 - B4B	
				Handfinish - 1 - 9 - B4B	
				Handfinish - 1 - 10 - B4B	
				Handfinish - 1 - 11 - B4B	
				Handfinish - 1 - 12 - B4B	
				Handfinish - 1 - 13 - B4B	
				Handfinish - 1 - 14 - B4B	
				Handfinish - 1 - 15 - B4B	
				Handfinish - 1 - 16 - B4B	
				Handfinish - 1 - 17 - B4B	
				Handfinish - 1 - 18 - B4B	
				Handfinish - 1 - 19 - B4B	
				Handfinish - 1 - 20 - B4B	
				Handfinish - 1 - 21 - B4B	
				Handfinish - 1 - 22 - B4B	
160 QC 7	1 pcs	9/25/19	0.00 0.00	QC 7 - 10	
				QC 7 - 13	
				QC 7 - 14	
				QC 7 - 15	
				QC 7 - 17	
				QC 7 - 18	
				QC 7 - 19	
				QC 7 - 2	
				QC 7 - 28	
				QC 7 - 3	
				QC 7 - 30	
				QC 7 - 34	
				QC 7 - 36	
				QC 7 - 37	
				QC 7 - 41	
				QC 7 - 47	

SEP 27 2019

				Packaging 3 - 18 - B4B	
				Packaging 3 - 19 - B4B	
				Packaging 3 - 20 - B4B	
				Packaging 3 - 21 - B4B	
				Packaging 3 - 22 - B4B	
				Packaging 3 - 23 - B4B	
				Packaging 3 - 24 - B4B	
				Packaging 3 - 25 - B4B	
				Packaging 3 - 26 - B4B	
				Packaging 3 - 27 - B4B	
				Packaging 3 - 28 - B4B	
				Packaging 3 - 29 - B4B	
				Packaging 3 - 30 - B4B	
				Packaging 3 - 31 - B4B	
				Packaging 3 - 32 - B4B	
				Packaging 3 - 33 - B4B	
				Packaging 3 - 34 - B4B	
				Packaging 3 - 35 - B4B	
				Packaging 3 - 36 - B4B	
200 QC 21 - SA	1	9/25/19	0.00 0.00	QC 21 - SA - 21	DAS
	pcs			QC 21 - SA - 70	27
				QC 21 - SA - 53	33

SEP 30 2019

Part Op 100 - 1 Cut contour and pockets as per Dwg Dwg Rev: C Prog Rev: C 2-Deburr if necessary
 Descriptions: 110 - (QC2- Inspect parts off machine FAI/FAIB)
 120 - (HAAS CNC Vertical Machine), Drill holes as per Folio FC969 and Dwg D5549-5 on Hass4 Dwg rev: _____
 130 - (QC2- Inspect parts off machine FAI/FAIB)
 140 - (QC8- Inspect parts - second check)
 150 - (Chemical Conversion Coat per QSI005 4.1)
 160 - (QC7-Inspect Chemical Conversion Coat)
 170 - (White Gloss(Ref:4.3.5.1) per QSI005 4.3.5.1-Alum). ***Mask holes or blow out access powdercoat in holes***
 START TIME: 2:10 OVEN TEMPERATURE: 320 FINISH TIME: 2:40 M193159
 180 - (QC3- Inspect Part Finish)
 190 - (Identify as per dwg & Stock Location: _____)
 200 - (QC21- Final Inspection - Work Order Release)

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
M6061T6B1.000X12.000	6061-T6 Bar 1.00 X 12.00	4.6000 ft (4.6 ea)	100-Waterjet - Flow - 1	5188587

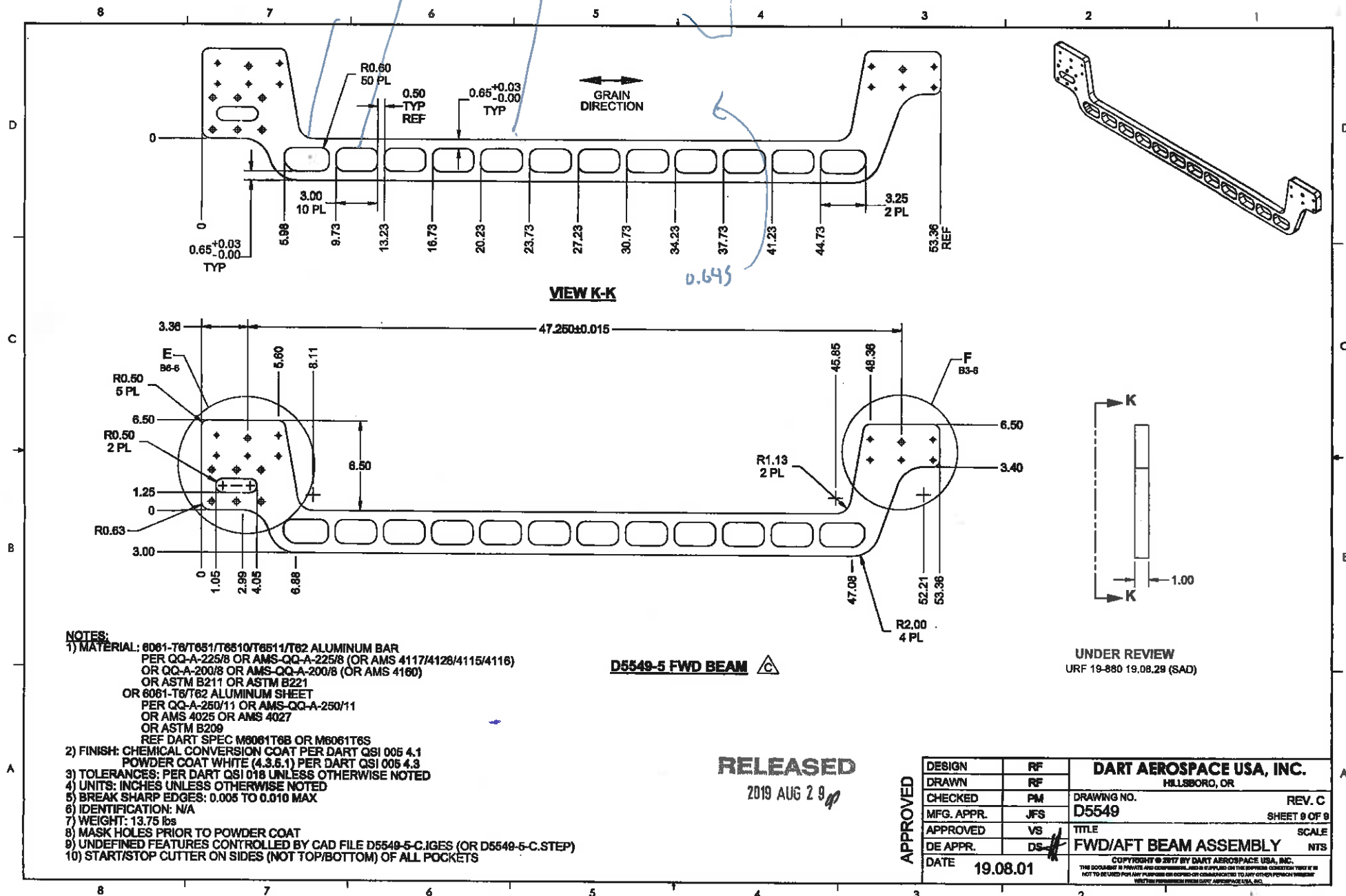
Job Allocations

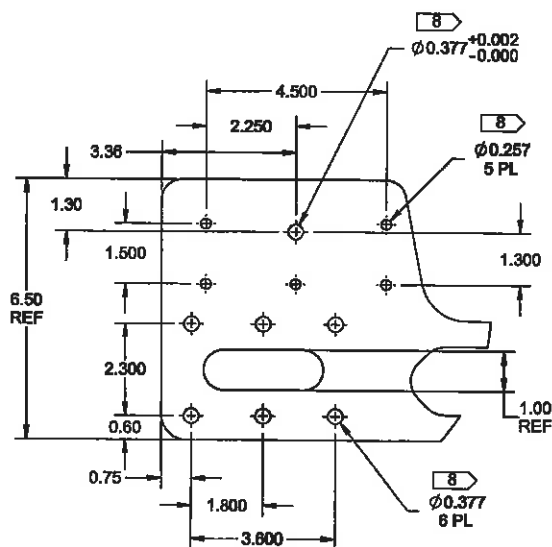
Operation	Component Part	Required	Inventory	Allocated
100-Waterjet - Flow - 1	M6061T6B1.000X12.000	5	24	0

Part Specifications

Specifications could not be found.

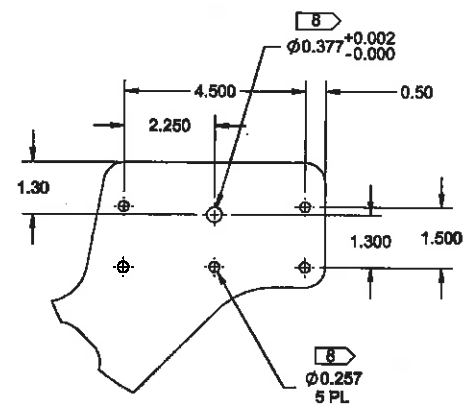
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DETAIL E

C8-5
C8-9



DETAIL F

C8-5
C8-9

UNDER REVIEW
URF 19-880 19.08.29 (SAD)

RELEASED

2019 AUG 29

APPROVED

DESIGN	RF	DART AEROSPACE USA, INC.	
DRAWN	RF	HILLSBORO, OR	
CHECKED	PM	DRAWING NO.	REV. C
MFG. APPR.	JFS	D5549	SHEET 8 OF 9
APPROVED	VS	TITLE	SCALE
DE APPR.	DS	FWD/AFT BEAM ASSEMBLY	
DATE	19.08.01	NTS	
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DART AEROSPACE LTD		Work Order: 200560
Description: FWD beam		Part Number: D5549-5
Inspection Dwg: D5549 Rev: A		Page 1 of 1

INSPECTION SHEET

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
1.00	0.030	1.00	/			
6.50	+/- 0.030	6.50	/			
0.65	+0.03 -0.00	0.65	/			
53.36	+/- 0.030	53.36	/			
3.25	+/- 0.030	3.25	/			
3.00	+/- 0.030	3.00	/			
1.00	+/- 0.030	1.00	/			
0.50	+/- 0.030	0.50	/			
1.30	+/- .030	1.294	✓		Vernier	
2.250	+/- .010	2.255	✓		Vernier	
4.500	+/- .010	4.503	✓		Vernier	
.377 Ø	+0.02 / -0.00	.377 Ø	✓		Pin gauge	
.50	+/- .030	.489	✓		Vernier	
1.500	+/- .010	1.489	✓		Vernier	
CNC HAAS 4						
1.30	+/- .030	1.290	✓		Vernier	
1.500	+/- .010	1.500	✓		Vernier	
2.300	+/- .010	2.297	✓		Vernier	
0.60	+/- .030	.594	✓		Vernier	
0.75	+/- .030	.744	✓		Vernier	
1.800	+/- .030	1.801	✓		Vernier	
3.600	+/- .010	3.600	✓		Vernier	
.377 Ø	+0.02 / -0.00	.377 Ø	✓		Pin gauge	
1.300	+/- .010	1.302	✓		Vernier	
.257 Ø	+0.05 / -0.01	.259 Ø	✓		Pin gauge	
4.500	+/- .010	4.504	✓		Vernier	
2.250	+/- .010	2.256	✓		Vernier	
3.600	+/- .030	3.599	✓		Vernier	

Measured by: M. M. DAS	Checked by: B. A.	QC Inspector:
Date: 9/24/1964	Date: 19-09-27	Date:

Engineering Approval: (If necessary)	Date:
--	--------------

Rev	Date	Change	Revised by	Approved
B	14.07.31	New Issue	KJ	

1.359

1.940

1.985

1.1735

2.1285

Vertical Load

Fz = 525 lbs
D = 36.94 in
Ma = Fz * D = 19,394 in lb
Mb = 0.5Ma = 9697 in lb
Ia = 1.75 in⁴
Ib = 1.75 in⁴
c = 1.50 in
Sva = Ma*c/Ia = 16,624 psi
Svb = Mb*c/Ib = 8312 psi

Maximum Vertical Load
Moment Arm from Basket CL to Section A-A
Maximum Bending Moment at Section A-A
Maximum Bending Moment at Section B-B
Moment of Inertia at Section A-A (from Solidworks)
Moment of Inertia at Section B-B (from Solidworks)
Distance to Outer Fibers
Maximum Bending Stress at Section A-A
Maximum Bending Stress at Section B-B

Drag Load

Fx = 123 lbs
D = 36.94 in
Ma = Fx * D = 4544 in lb
Mb = 0.5* Ma = 2272 in lb
Ia = 0.10 in⁴
Ib = 0.10 in⁴
c = 0.50 in
Sda = Ma*c/Ia = 22,720 psi
Sdb = Mb*c/Ib = 11,360 psi

Maximum Drag Load
Moment Arm from Basket CL to Section A-A
Maximum Bending Moment at Section A-A
Maximum Bending Moment at Section B-B
Moment of Inertia at Section A-A (from Solidworks)
Moment of Inertia at Section B-B (from Solidworks)
Distance to Outer Fibers
Maximum Bending Stress at Section A-A
Maximum Bending Stress at Section B-B

Combined Stress at Section A-A

Sta = (Sva² + Sda²)^{0.5} = 28,152 psi

Maximum Combined Bending Stress at Section A-A

Fcy = 33 ksi
MS = Fcy/Sta - 1 = 0.17 (was 0.26)

Maximum Limit Bending Stress (see Appendix A)
Margin of Safety in Bending (Limit)

Ftu = 37 ksi
Fo = 40.5/42 * 37 ksi = 35.6 ksi
K = 1.5
Fb = Ftu + Fo (K-1) = 54.8 ksi
MS = Fb/(sf * Sta) - 1 = 0.297 (was 0.40)

Maximum Ultimate Bending Stress (see Appendix A)
Based on Table C3.2 of Bruhn
For a rectangular section per Figure C3.7 of Bruhn
Modulus of Rupture
Margin of Safety in Bending (Ultimate)

Combined Stress at Section B-B

Stb = (Svb² + Sdb²)^{0.5} = 14076 psi

Maximum Combined Bending Stress at Section B-B

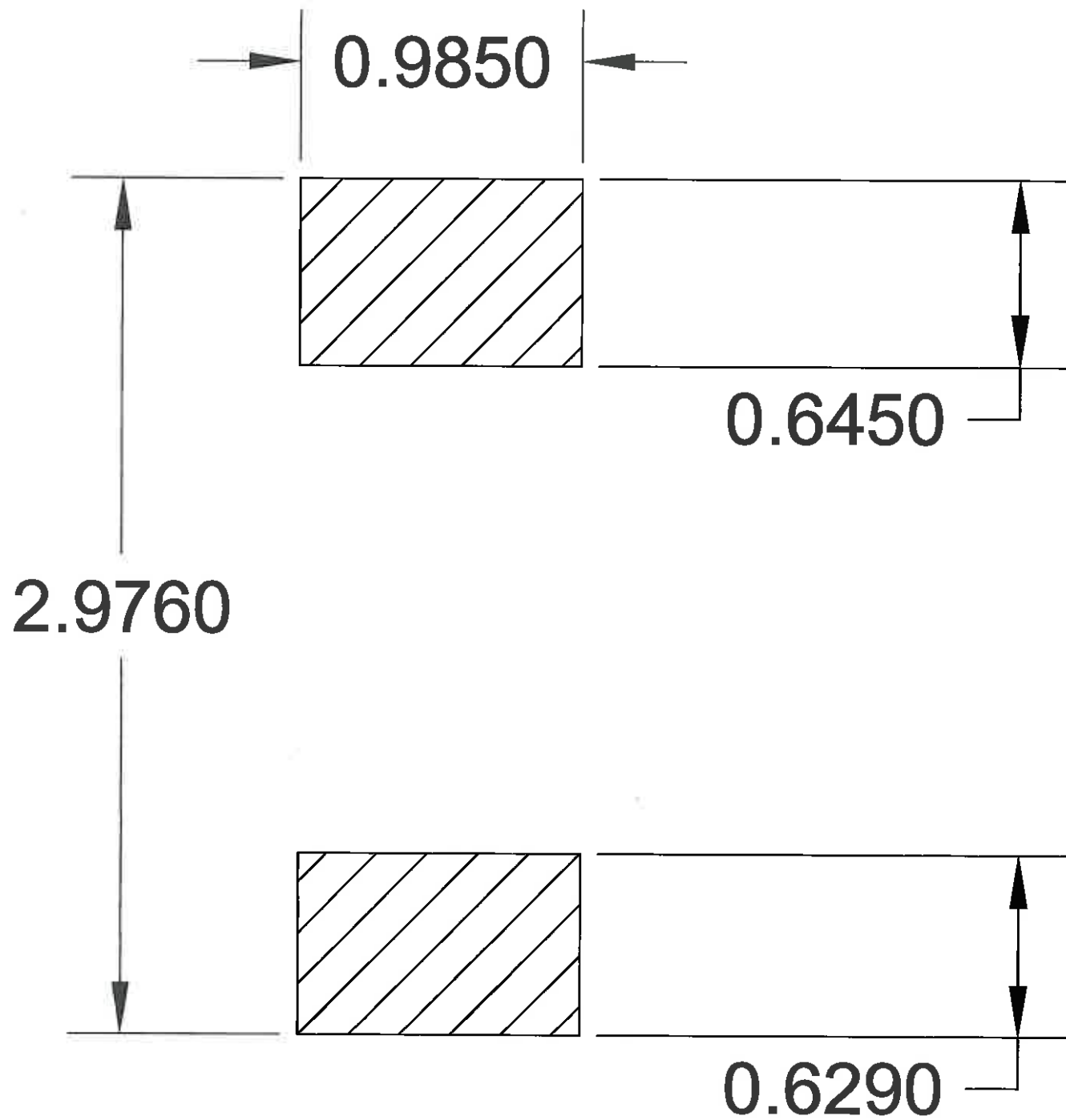
Fcy = 33 ksi
MS = Fcy/Stb - 1 = 1.34 (was 0.95)

Maximum Limit Bending Stress (see Appendix A)
Margin of Safety in Bending (Limit)

Ftu = 37 ksi
Fo = 40.5/42 * 37 ksi = 35.6 ksi
K = 1.5
Fb = Ftu + Fo (K-1) = 54.8 ksi
MS = Fb/(sf * Stb) - 1 = 1.59 (was 1.15)

Maximum Ultimate Bending Stress (see Appendix A)
Based on Table C3.2 of Bruhn
For a rectangular section per Figure C3.7 of Bruhn
Modulus of Rupture
Margin of Safety in Bending (Ultimate)

19/9/25



$$I_x = 1.75$$
$$I_y = 0.10$$

Min measured values.

P 15/5/25

Entered:

2K

Date:

Oct 23/19



NCR No.

19-7519

WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

Route update only ☐

Job: <u>200566</u> Part No. <u>D5549-5</u>		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☒		DEPARTMENT/PROCESS Skid-tube ☐ Machining ☒ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Eng. (Non-AW) ☐ Prod. Eng. Coord. ☒ Rec/Store/Packaging ☐ Engineering ☒ Water Jet ☒ Supplier ☐ Quality ☐																															
Date: <u>19/9/26</u>		Sequence #: <u>100</u>		QTY Affected: <u>1</u>		MRB (QSI042) INSP 12 <u>9/19/26</u>																													
Description Work Order Deviation				Disposition		Completed By																													
Dimension $0.65^{+0.03}_{-0.00}$ is under tolerance. One edge is <u>0.629 (min)</u> & other is <u>0.645 (min)</u> .				Acceptable. Attached analysis based on SR-9117-1644-1 demonstrates that margins of safety are still positive.		<u>9/19/26</u> Lead hand / Supervisor <u>S.A. 19-09-27</u>																													
Root Cause Operator ☒ Manufacturing Process ☒ Equip/Tooling ☐ Handling/Preservation ☐ Material ☐ Product Improvement ☐ Process Improvement ☐ Human Factors ☐				FAULT CATEGORY <table border="0"> <tr> <td>☐ Pressure/Forced</td> <td>☐ Contamination</td> <td>☐ Power Loss/Surge</td> <td>☐ Positioned Wrong</td> </tr> <tr> <td>☐ Bending</td> <td>☐ Misaligned/off center</td> <td>☒ Folio/Program</td> <td>☒ Outside Tolerance</td> </tr> <tr> <td>☐ Crushing</td> <td>☐ BOM/Route</td> <td>☐ Grain Direction</td> <td>☐ Drawing</td> </tr> <tr> <td>☐ Cracks</td> <td>☐ Broken/Damage/Defect</td> <td>☐ Weld</td> <td>☐ Finish</td> </tr> <tr> <td>☐ Crimp/Kink/Ripple/Wave/Twist</td> <td>☐ Incomplete/Unclear Instructions</td> <td>☐ Wrong Stock Pulled</td> <td>☐ Part Lost/Missing</td> </tr> <tr> <td>☐ Marks/Chatter</td> <td>☐ Drill Holes</td> <td>☐ Out of Sequence</td> <td>☐ Misread</td> </tr> <tr> <td>☐ Mislabeled</td> <td>☐ Fit/Function</td> <td>☐ Off-set/Set-up</td> <td></td> </tr> </table>				☐ Pressure/Forced	☐ Contamination	☐ Power Loss/Surge	☐ Positioned Wrong	☐ Bending	☐ Misaligned/off center	☒ Folio/Program	☒ Outside Tolerance	☐ Crushing	☐ BOM/Route	☐ Grain Direction	☐ Drawing	☐ Cracks	☐ Broken/Damage/Defect	☐ Weld	☐ Finish	☐ Crimp/Kink/Ripple/Wave/Twist	☐ Incomplete/Unclear Instructions	☐ Wrong Stock Pulled	☐ Part Lost/Missing	☐ Marks/Chatter	☐ Drill Holes	☐ Out of Sequence	☐ Misread	☐ Mislabeled	☐ Fit/Function	☐ Off-set/Set-up	
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